

CLAIMS

What is claimed is:

1. A hearing aid comprising:
 - a first half shell;
 - 5 a second half shell attached to the first half shell;
 - a microphone, a battery, electronics, a receiver and a flexible tip mounted within a housing formed by the first half shell and the second half shell; and
 - a mechanical securing mechanism located on the first half shell and the second half shell, the securing mechanism attaching the first half shell to the
 - 10 second half shell.
2. The hearing aid of claim 1 wherein the securing mechanism comprises an interlocking joint.
3. The hearing aid of claim 1 further comprising an aperture to allow a potting material to be introduced into the hearing aid, the potting material minimizing
- 15 acoustic and mechanical feedback created by the components in the hearing aid.
4. The hearing aid of claim 1 further comprising a microphone retainer to secure the microphone against a faceplate of the hearing aid, the microphone retainer minimizing the space formed between the microphone and the faceplate, thereby reducing resonances in the acoustic frequency response of the hearing aid.
- 20 5. The hearing aid of claim 4 wherein the microphone retainer comprises a protrusion formed within the first half shell and the second half shell.
6. The hearing aid of claim 1 wherein the flexible tip comprises a mushroom shaped tip.

7. The hearing aid of claim 1 wherein the flexible tip comprises an isolation nest, the receiver being mounted within the isolation nest.
8. The hearing aid of claim 1 wherein the hearing aid is an in-the-canal hearing aid.
9. The hearing aid of claim 1 further comprising an adhesive seal formed between the first half shell and the second half shell.
10. A hearing aid comprising:
 - a housing having any of a microphone, a battery, electronics and a receiver; and
 - a microphone retainer to secure the microphone against a faceplate of the hearing aid, the microphone retainer minimizing the space formed between the microphone and the faceplate, thereby reducing resonances in the acoustic frequency response of the hearing aid.
11. The hearing aid of claim 10 wherein the microphone retainer comprises a protrusion formed within the housing of the hearing aid.
12. A method for minimizing resonance in the acoustic frequency response in a hearing aid comprising:
 - providing a shell having microphone retainer and a faceplate;
 - providing a microphone;
 - inserting a microphone within the microphone retainer; and
 - allowing the microphone retainer to secure the microphone against the faceplate of the hearing aid thereby minimizing resonance in the acoustic frequency response in the hearing aid.

13. A method for manufacturing a hearing aid comprising:
 - providing a first half shell and a second half shell;
 - providing a microphone, a battery, electronics, a receiver and a flexible tip;
 - 5 inserting components within first half shell;
 - aligning the second half shell with the first half shell; and
 - mechanically attaching first half shell to second half shell.
14. The method of claim 8 further comprising potting the internal components of the hearing aid to minimize acoustic and mechanical feedback created by the components in the hearing aid.
15. A flexible tip for a hearing aid comprising:
 - a tip portion;
 - a sound port attached to the tip portion; and
 - a vent formed in the flexible tip, the vent providing static pressure equilibrium between an ear canal and an ambient pressure.
16. The flexible tip of claim 15 wherein the vent comprises an aperture located within the flexible tip.
17. The flexible tip of claim 16 wherein the aperture is located parallel to the sound port of the tip.
18. The flexible tip of claim 17 wherein the aperture is located within a rib formed between the tip portion and the sound port.
19. The flexible tip of claim 16 wherein the aperture is formed within the tip portion.

20. The flexible tip of claim 19 wherein the aperture is formed within the tip portion at an angle of approximately 90 degrees with respect to a rib formed between the tip portion and the sound port.
21. The flexible tip of claim 16 wherein the aperture is located in the sound port.
- 5 22. The flexible tip of claim 21 wherein the aperture is formed by a capillary tube.
23. The flexible tip of claim 22 wherein the capillary tube comprises a valve.
24. The flexible tip of claim 23 wherein the valve includes a ball valve.
25. The flexible tip of claim 16 wherein the aperture is filled with a sound absorbing material to minimize acoustical feedback.
- 10 26. The flexible tip of claim 15 wherein the vent comprises a channel formed on at least a portion of a surface of the tip portion.
27. The flexible tip of claim 15 wherein the vent comprises a surface roughness formed on a surface of the tip portion.
28. The flexible tip of claim 27 wherein the surface roughness comprises a plurality of ridges.
- 15 29. The flexible tip of claim 15 wherein the vent further comprises a valve, the valve regulating air entering and exiting an ear canal to equalize pressure between the ear canal and an external ambient pressure.

30. The flexible tip of claim 29 wherein the valve is formed as a flap on the sound port.
31. The flexible tip of claim 29 wherein the valve is a hinge valve mounted within the sound port.
- 5 32. A flexible tip that allows a rapid disengagement in a seal formed between the tip and an ear canal comprising:
a sound port having a proximal end and a distal end; and
a tip portion attached to the sound port, the tip portion having a proximal end and a distal end and the tip portion having a geometry that distorts upon
10 insertion or removal of the flexible tip from an ear canal, the distortion equalizing pressure between the ear canal and an ambient pressure.
33. The flexible tip of claim 32 wherein the proximal end of the sound port attaches to the proximal end of the tip portion, allowing the distal portion of the tip portion to distort during insertion to or removal from an ear canal.
- 15 34. The flexible tip of claim 32 wherein the tip portion comprises a decreased thickness portion wherein the thickness of the decreased thickness portion tapers from the proximal end to the distal end of the tip portion to allow distortion of the tip portion during removal of the flexible tip form the ear canal.
- 20 35. The flexible tip of claim 32 wherein the tip portion comprises at least one protrusion located about the circumference of the tip portion to allow distortion of the tip portion during removal of the flexible tip form the ear canal..
36. A flexible tip that allows a rapid disengagement in a seal formed between the tip and an ear canal comprising:

a sound port having a proximal end and a distal end; and

- 5 a tip portion attached to the sound port, the tip portion having a proximal end and a distal end and the tip portion having a surface area that provides a minimal contact surface between an ear canal and the tip portion, the minimal contact surface equalizing pressure between the ear canal and an ambient pressure during removal of the flexible tip from the ear canal.

37. A flexible tip for a hearing aid providing static pressure equilibrium between an ear canal and an ambient pressure comprising:

a tip portion; and

- 10 a sound port attached to the tip portion, the tip portion and sound port formed of a porous material, the porous material allowing transfer of air between an ear canal and an ambient pressure to provide pressure equalization.